Policy No._____

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION

DEPARTMENTAL POLICY

Policy Name: Noise Abatement	Effective Date:	Division: Transportation Planning
Purpose: **Guidelines to determine need for noise abatement measures on roadway projects.**	**Authorized Signature:** _____ ___ Thomas R. Buick, P.E. Transportation Director	

I. INTRODUCTION

The Maricopa County Department of Transportation(MCDOT) will employ the following guidelines to determine the need, feasibility, and reasonableness of noise abatemenl measures on all roadway projects.

This policy is based on the currently accepted practices and procedures used by federal and state transportation agencies to assess highway-related noise levels. A review of this policy will be conducted on a biennially basis.

II. DEFINITIONS

A. Barrier -- A natural or man-made object that interrupts the path of sound from the sound source to the sound receiver

B. Decibel (dB) --A measure used to express the relative level of a sound in comparison with a standard reference level.

C. dB(A) -- A weighting network using an electronic filter in a sound level meter which approximates the frequency response of the human ear.

D. Design Year -- The future year, usually 20 years from the initial project evaluation, for which traffic projections are made in establishing design criteria for a specific project.

E. Existing Noise Level -- The noise resulting from the natural and mechanical sources and human activity considered to be usually present in a particular area. This provides a reference base for determining noise impacts when transportation improvements or new highways are being considered.

F. Leq --The equivalent, steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same period.

G. Noise Abatement Criteria -- The upper limit of acceptable traffic noise level conditions. These levels are used to determine the impact of traffic noise on human activities.

H. Predicted Noise Levels -- The noise level (Leq) calculated for the worst traffic noise conditions likely to occur on a regular basis during the design year.

I. Traffic Noise Impacts -- Impacts which occur when the predicted noise levels approach or exceed the Noise Abatement Criteria (NAC) levels or when the predicted traffic noise levels substantially exceed the existing levels.

J. TYPE I Project --Construction of a highway on new location, or the physical alteration of an existing highway which significantly changes the horizontal or vertical alignment or increases the number of through-traffic lanes.

K. TYPE II Project -- A proposed highway project strictly for noise abatement on an existing highway.

L. Worst Traffic Noise Condition -- When the predicted peak-hour traffic is moving at the posted speed limit. An exception to this would occur when the predicted traffic exceeds the highway's capacity. For this situation, MCDOT will use the highway's capacity at the posted speed.

III. FEDERAL HIGHWAY ADMINISTRATION GUIDELINES

The Federal Highway Administration (FHWA) has issued regulations for noise evaluation in 23 CFR Part 772, **Procedures for Abatement of Highway Traffic Noise and Construction Noise.** The main objective of 23 CFR Part 772 is "to provide procedures for noise studies and noise abatement measures, to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23, United States Code (U.S.C.)."

The Maricopa County Department of Transportation follows the FHWA criteria for all TYPE I projects. However, MCDOT has chosen not to conduct TYPE II projects at this time.

As directed by 23 CFR Part 772, the FHWA has developed specific noise abatement criteria that serve as the upper limit of acceptable traffic noise levels for various types of land use. These criteria are depicted in Table 1.

TABLE 1
Noise Abatement Criteria (NAC)
Hourly (h) A-Weighted Sound Level in Decibels (dBA)

Activity Category	Leq(h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenety and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, end hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

IV. NOISE IMPACT DETERMINATION

A traffic noise impact occurs for purposes of this policy, when either of the following conditions

occur:

A. Approaches federal standard--The predicted traffic noise level --The predicted traffic noise level approaches or exceeds the noise abatement criterion (NAC) in Table 1. MCDOT defines **"approach"** as within 1 dBA of the NAC.

B. Subtantial Increase--The predicted traffic noise level substantially exceeds the existing noise level. MCDOT defines **"substantial"** in this context as 15 dBA.

V. NOISE ABATEMENT OBJECTIVES

Noise abatement measures must be reasonable and feasible. Feasibility deals primarily with engineering considerations (e.g., can a barrier be built given the topography of the location; can a substantial noise reduction be achieved given certain access. drainage, safety, or maintenance requirements; are other noise sources present in the area, etc.) Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision.

When noise abatement measures are considered, reasonableness criteria shall include, but not be limited to, the following:

A. Amount of noise reduction provided.

When noise abatement measures are considered, substantial noise reductions shall be made. Substantial noise reduction should be 5 dBA or greater.

B. Cost of abatement.

An acceptable cost/residence index should be $3,000/residence/dBA or less.

Residences should include all dwelling units, i.e., owner occupied, rental units, mobile homes. etc.

When counting residences to determine reasonableness, all "benefited" residences should be included regardless of whether or not they were identified as impacted (each unit in a multi-family building should be counted as one residence in determining both impacts and benefits.

The threshold of noise reduction which determines a "benefited" residence is 5 dBA.

C. Views of impacted residents.

Specific project impacts will be evaluated with property owners directly affected. Noise barriers will be constructed where cost effective(meeting criteria in B.) and consistent with the owners desires.

Informal procedures, such as surveys or individual meetings shall be used as needed to gather input from impacted residents.

D. Future noise levels

MCDOT will give greater consideration to residential areas where high traffic noise levels are expected to occur, e.g., greater than 70 dBA, or where large increases over existing noise levels are anticipated. e.g., greater than a 15 dBA increase.

E. The timing and consideration of development along the highway

MCDOT will give greater consideration to 1) residential areas along highways on new location, 2) residential areas that were constructed before an existing highway, and 3) residential areas that have been in place along an existing highway for an extended period of time. MCDOT will give no consideration to residential areas that have developed along an existing highway without proper consideration of traffic noise impacts by the local community or developer.

F. Commercial areas -- Unless special conditions exist, it generally will not be considered reasonable to provide abatement for impacted businesses.

G. Isolated receptors -- unless special conditions exist, it generally will not be considered reasonable to provide abatement for isolated receptors. Based on past project experience, it is considered unreasonable to provide abatement for isolated residences due to the cost of abatement versus the benefits provided.

H. Clear recovery zone -- A noise barrier will be located beyond the clear recovery zone or be incorporated into safety devices. Noise barriers will not be constructed if they create a potential safety hazard.

I. Multi-Level Structures--MCDOT will only provide noise abatement for the first story of a multi-story structure.

J. Height Limits--Generally, MCDOT will not construct noise barriers where site characteristics prohibit a reasonable height barrier [3 meters (10 feet)] from obtaining a

substantial reduction (5 dBA or greater) in noise level.

K. Recreational Areas--For outdoor recreation areas such as parks, picnic areas, playgrounds, etc., noise impacts are generally considered to exist only in the developed portions which have frequent human use and where a lowered noise level would be of benefit.

L. Non-Access Controlled Facilities--Unless special conditions exist and effective abatement can be provided, it is not considered reasonable to provide noise barriers on non-access controlled facilities.

M. Noise Insulation--MCDOT's policy on noise insulation will comply with a recent U.S. Department of Transportation Federal Highway Administration paper, "Highway Traffic Noise in the United States, Problems and Responses," August 1994, which states that "federal-aid highway funds may be used for noise insulation of public use or nonprofit institutional structures. Such funds may also be used for noise insulation of residences and other private-use buildings where noise impacts are especially severe, and where no other abatement is possible." An "especially severe" noise impact will be defined as a noise level of 75 dBA Leq(h) or more, or when the noise level increases by 30 dBAs or more over existing levels.

The above listing is not intended to be all encompassing. Rather, it is intended to indicate some of the factors that should be considered in determining the feasibility and reasonableness of proposed abatement measures.

VI. NOISE MITIGATION

A. Traffic Management and Highway Configuration

1. Truck Restrictions

Truck restrictions may be evaluated as a means to mitigate traffic noise in some extreme cases consistent with the MCOT Truck Traffic Policy. Such restrictions are not recommended where they conflict with the intended use of the roadway or create unreasonable delay or hardship on the motoring public.

2. Speed Restrictions

Speed restrictions may be evaluated to mitigate traffic noise where they do not conflict with the roadway's designated use, they do not create unreasonable delay or hardship to the motoring public, and they do not create a safety or enforcement problem.

3. Highway Design

Roadway grade and alignment can play a significant role in the reduction of traffic noise impacts. A depressed roadway can effectively mitigate much of the traffic noise to adjacent receptors. If a project has a need for additional fill material, a lower roadway grade may be a cost-effective method to provide the fill material while reducing traffic noise. Changes in the alignment of the roadway can also decrease traffic noise levels at sensitive receptors.

It is essential to recognize the effect a change in the roadway grade or alignment can have on existing noise mitigation efforts. In a case where noise barriers already exist, a substantial change in the roadway grade may render the existing barrier less effective or ineffective. Consideration should be given to the potential effect a change in grade or alignment can have on existing mitigation features.

4. Pavement Design In recent years a new asphalt rubber concrete (ARC) pavement surface has been researched as a way of reducing highway noise. MCDOT's position on the ARC pavement is that until such time as the industry has a better understanding of the long-term performance of this pavement, MCDOT will not use it as a primary noise abatement technique.

5. Noise Barrier Design Considerations

MCDOT will design for a ground floor outdoor activity area such as a patio deck or pool. If there are no outdoor activities near the roadway, MCDOT will design for five feet above the ground at the building face.

VII. RESIDENTIAL LAND-USE POLICY

Traffic noise analysis will be done for developed lands and undeveloped lands where development is planned, designed, and programmed. Development will be deemed to be planned, designed, and programmed if a noise-sensitive land, such as a residence, school, church, hospital, library, etc., has received a building permit from the local agency with jurisdiction at the time of the noise analysis.

The date of public knowledge shall be the date that a project's environmental analysis and documentation is approved, i.e., the date of environmental approval. After this date, MCDOT is still responsible for analyzing changes in traffic noise impacts, when appropriate, but MCDOT is no longer responsible for providing noise abatement for new development which occurs adjacent to the proposed highway project. Provision of such noise abatement becomes the responsibility of local communities and private developers.

In determining the reasonableness and feasibility of noise abatement, MCDOT will meet with impacted residents and present a brief program on highway traffic noise to explain and demonstrate the characteristics of highway traffic noise, the effects of noise barriers in attenuating traffic noise, and the types of noise barriers that may be considered. As available, specific details - location, length, height, aesthetic treatment, landscaping, maintenance, drainage, safety, etc. -- of noise barriers being studied will also be provided in addition to a discussion of alternatives to barrier construction.

MCDOT will then solicit the views and opinions of the impacted residents and make a preliminary determination on the reasonableness and feasibility of noise abatement. After completion of final design, MCDOT will meet again with the impacted residents to present final barrier design details and to solicit the residents' final views and opinions on barrier construction. MCDOT will then make a final determination on the reasonableness and feasibility of noise abatement.

MCDOT will furnish the results of all highway traffic noise analyses to local government officials and will encourage local communities and developers to practice noise compatible development. Local coordination will specifically be accomplished through the distribution of highway project environmental documents and noise study reports.

IX. EXTENUATING CIRCUMSTANCES

There may be extenuating circumstances where unique or unusual conditions warrant special consideration of highway traffic noise impacts and/or implementation of noise abatement measures. These circumstances could involve areas such as 1) those that are extremely noise sensitive, 2) those where severe traffic noise impacts are anticipated, or 3) those containing Section 4(f) resources as defined in the U.S. Department of Transportation Act of 1966. Extenuating circumstances will be considered on an individual project basis.